

What is claimed is:

1. An apparatus for automatically stuffing tubular food casing with food product which comprises a stuffing horn through which food product flows into tubular food casing deshirred from a shirred food casing stick on the stuffing horn, an input end of the stuffing horn being interconnected with a pressurized source of food product, a clipping device for closing stuffed food casing with a clip, a means for causing a tape, holding lengths of string having end portions secured together to form string loops, to be directed toward the clipping device for closing an end of the food casing so that a string loop is transferred directly from the tape into an entry into a slot in the clipping device so that when the end of the food casing is closed with the clip, the clip draws the loop to the casing and holds the loop to the food casing between a major portion of the loop and the secured together end portions of the string.
2. The apparatus of claim 1 wherein the means for causing the tape to be directed toward the clipping device comprises a plurality of rolls including a tape supply roll, a drive roll, a takeup roll and at least one intermediate roll which is proximate said entry so that the secured together end portions of a string project from the tape into the entry into the slot as the tape passes around the intermediate roll.
3. The apparatus of claim 2 wherein a means is provided for driving the drive roll to pull the tape from the supply roll around the intermediate roll.
4. The apparatus of claim 3 wherein an edge is provided for catching secured together end portions of a string loop as it passes around the intermediate roll to cause the secured

together portions of the string to protrude from the tape into the entry to the slot and to assist in removal of the string loop from the tape.

5. The apparatus of claim 4 wherein an air source is provided that directs the secured together end portions of the string loop into the entry to the slot.

6. The apparatus of claim 1 wherein the secured together portions are secured together by means of a knot.

7. The apparatus of claim 1 wherein an input end of the stuffing horn is interconnected with a pressurized source of food product through a food product cut-off valve, said valve comprising a tapered valve seat having a frustoconical tapered side wall and having opposing inlet and outlet openings in the side wall, said valve further comprising a frustoconical plastic insert tapered to mate with the tapered valve seat for insertion into the valve seat, said plastic insert having a longitudinal axis and a hole passing through the insert perpendicularly to the longitudinal axis in a position such that it may be rotated to cause the hole to align with the opposing inlet and outlet openings to permit food product to pass through the inlet opening in the valve seat, through the hole in the insert and through the outlet opening in the valve seat to the stuffing horn and may also be rotated to cause the hole to become misaligned with the inlet and outlet openings to impede the flow of food product to the stuffing horn.

8. The apparatus of claim 1 wherein means is provided to radially compress the stuffed food casing to cause a restricted location along a stuffed food casing length, said clipping device being configured to clip the casing at the restricted location.

9. The apparatus of claim 8 wherein a punch is provided for forcing a clip against a clip anvil to bend the clip around the restricted portion of the casing in the form of a helix.

10. The apparatus of claim 9 wherein two punch surfaces are provided to apply two spaced clips to the restricted location in the shape of mirror image helixes and a knife is provided to cut the casing between the applied clips.
11. Apparatus of claim 9 wherein a housing is provided having a channel for travel of the punch and an external punch slot is provided for easy access to the channel for easily replacing the punch.
12. Apparatus according to claim 10 wherein access to the knife is provided so that it can be easily replaced without disassembly of the clipping device.
13. The apparatus of claim 1 wherein the clipping device is of sufficiently light weight and is driven by a sufficient power source to obtain a clipping cycle time of less than 3 seconds.
14. The apparatus of claim 1 wherein a conveyor is provided to remove stuffed food product from the vicinity of the clipping device after stuffed food casing is closed, said conveyor comprising a conveying belt, said belt traveling over slacker idler rollers beneath a conveying surface of the belt that permit the length of the conveying surface to be extended and retracted to extend and reduce a space between the clipping device and the conveying surface.
15. The apparatus of claim 14 wherein means is provided to cause the conveyor to retract to increase the space when gatherers for the clipping device are operating to gather stuffed food casing to form a radial restriction in the stuffed food casing and to extend to reduce the space and place the conveying surface near the clipping device when the gatherers are dormant.

16. An apparatus for automatically stuffing tubular food casing with food product which comprises a stuffing horn through which food product flows into tubular food casing deshirred from a shirred food casing stick on the stuffing horn, an input end of the stuffing horn being interconnected with a pressurized source of food product, a clipping device for closing stuffed food casing with a clip, wherein the stuffing horn is interconnected with a pressurized source of food product through a food product cut-off valve, said valve comprising a tapered valve seat having a frustroconical tapered side wall and having opposing inlet and outlet openings in the side wall, said valve further comprising a frustroconical plastic insert tapered to mate with the tapered valve seat for insertion into the valve seat, said plastic insert having a longitudinal axis and a hole passing through the insert perpendicularly to the longitudinal axis in a position such that it may be rotated to cause the hole to align with the opposing inlet and outlet openings to permit food product to pass through the inlet opening in the valve seat, through the hole in the insert and through the outlet opening in the valve seat to the stuffing horn and may also be rotated to cause the hole to become misaligned with the inlet and outlet openings to impede the flow of food product to the stuffing horn.

17. An apparatus for automatically stuffing tubular food casing with food product which comprises a stuffing horn through which food product flows into tubular food casing deshirred from a shirred food casing stick on the stuffing horn, an input end of the stuffing horn being interconnected with a pressurized source of food product, a clipping device for closing stuffed food casing with a clip, wherein means is provided to radially compress the stuffed food casing to cause a restricted location along a stuffed food casing length, said clipping device being configured to clip the casing at the restricted location and a punch and

anvil are provided and configured so that the punch forces a clip against the clip anvil to bend the clip around the restricted portion of the casing in the form of a helix.

18. The apparatus of claim 17 wherein two punch surfaces are provided to apply two spaced clips to the restricted location in the shape of mirror image helixes and a cutting means is provided to cut the casing between the applied clips.

19. Apparatus according to claim 17 wherein the cutting means is a knife and access to the knife is provided so that it can be easily replaced without disassembly of the clipping device.

20. Apparatus of claim 17 wherein a housing is provided having a channel for travel of the punch and an external punch slot is provided for easy access to the channel for easily replacing the punch.

21. An apparatus for automatically stuffing tubular food casing with food product which comprises a stuffing horn through which food product flows into tubular food casing deshirred from a shirred food casing stick on the stuffing horn, an input end of the stuffing horn being interconnected with a pressurized source of food product, a clipping device for closing stuffed food casing with a clip, wherein a conveyor is provided to remove stuffed food product from the vicinity of the clipping device after stuffed food casing is closed, said conveyor comprising a conveying belt, said belt traveling over slacker idler rollers beneath a conveying surface of the belt that permit the length of the conveying surface to be extended and retracted to extend and reduce a space between the clipping device and the conveying surface.

22. An apparatus for automatically stuffing tubular food casing with food product which comprises a stuffing horn through which food product flows into tubular food casing

deshirred from a shirred food casing stick on the stuffing horn, an input end of the stuffing horn being interconnected with a pressurized source of food product, a clipping device for closing stuffed food casing with a clip, wherein the clipping device is of sufficiently light weight and is driven by a sufficient power source to obtain a clipping cycle time of less than 3 seconds.

23. An apparatus for automatically stuffing tubular food casing with food product which comprises a stuffing horn through which food product flows into tubular food casing deshirred from a shirred food casing stick on the stuffing horn, an input end of the stuffing horn being interconnected with a pressurized source of food product, a clipping device for closing stuffed food casing with a clip, wherein two punch surfaces are provided to apply two spaced clips to the restricted location in the shape of mirror image helixes and a cutting means is provided to cut the casing between the applied clips.

24. Apparatus according to claim 23 wherein the cutting means is a knife and access to the knife is provided so that it can be easily replaced without disassembly of the clipping device.

25. A method for automatically stuffing tubular food casing with food product which comprises passing food product through a stuffing horn into tubular food casing deshirred from a shirred food casing stick on the stuffing horn where an input end of the stuffing horn is interconnected with a pressurized source of food product, closing stuffed food casing with a clip using a clipping device, causing a tape, holding lengths of string having end portions secured together to form string loops, to be directed toward the clipping device for closing an end of the food casing, transferring a string loop directly from the tape into an entry into a slot in the clipping device so that when the end of the food casing is closed with the clip, the

clip draws the loop to the casing and holds the loop to the food casing between a major portion of the loop and the secured together end portions of the string.

26. The method of claim 25 wherein the means for causing the tape to be directed toward the clipping device comprises a plurality of rolls including a tape supply roll, a drive roll, a takeup roll and at least one intermediate roll which is proximate said entry so that the secured together end portions of a string project from the tape into the entry into the slot as the tape passes around the intermediate roll.

27. The method of claim 26 wherein comprising driving the drive roll to pull the tape from the supply roll around the intermediate roll.

28. The method of claim 27 comprising causing secured together end portions of a string loop as it passes around an edge to protrude from the tape into the entry to the channel and to assist in removal of the string loop from the tape.

29. The method of claim 28 comprising directing the secured together end portions of the string loop into the entry to the channel using an air source.

30. The apparatus of claim 25 wherein the secured together portions are secured together by means of a knot.

31. The method of claim 25 wherein an input end of the stuffing horn is interconnected with a pressurized source of food product through a food product cut-off valve, said valve comprising a tapered valve seat having a frustroconical tapered side wall and having opposing inlet and outlet openings in the side wall, said valve further comprising a frustroconical plastic insert tapered to mate with the tapered valve seat for insertion into the valve seat, said plastic insert having a longitudinal axis and a hole passing through the insert perpendicularly to the longitudinal axis and rotating the insert to a position that causes the

hole to align with the opposing inlet and outlet openings to permit food product to pass through the inlet opening in the valve seat, through the hole in the insert and through the outlet opening in the valve seat to the stuffing horn and rotating the insert to cause the hole to become misaligned with the inlet and outlet openings to impede the flow of food product to the stuffing horn.

32. The method of claim 25 wherein the stuffed food casing is radially compressed to cause a restricted location along a stuffed food casing length, said clipping device being configured to clip the casing at the restricted location.

33. The method of claim 32 wherein a clip is forced by a punch to an anvil to bend the clip around the restricted portion of the casing in the form of a helix.

34. The method of claim 33 wherein two spaced clips are applied to the restricted location using two punch surfaces so that the applied clips are in the shape of mirror image helixes and the casing is cut between the applied clips with a knife.

35. The method of claim 25 wherein stuffed food product is removed from the vicinity of the clipping device after stuffed food casing is closed using a conveyor where the conveyor comprising a conveying belt, said belt traveling over slacker idler rollers beneath a conveying surface of the belt that permit the length of the conveying surface to be extended and retracted to extend and reduce a space between the clipping device and the conveying surface.

36. The method of claim 35 wherein the conveyor is retracted to increase the space when gatherers for the clipping device are operating to gather stuffed food casing to form a radial restriction in the stuffed food casing and the conveyor is extended to reduce the space and place the conveying surface near the clipping device when the gatherers are dormant.



37. A method for automatically stuffing tubular food casing with food product which comprises causing food product to flow through a stuffing horn into tubular food casing deshirred from a shirred food casing stick on the stuffing horn, an input end of the stuffing horn being interconnected with a pressurized source of food product, closing stuffed food casing with a clip using a clipping device, wherein the stuffing horn is interconnected with a pressurized source of food product through a food product cut-off valve, said valve comprising a tapered valve seat having a frustroconical tapered side wall and having opposing inlet and outlet openings in the side wall, said valve further comprising a frustroconical plastic insert tapered to mate with the tapered valve seat for insertion into the valve seat, said plastic insert having a longitudinal axis and a hole passing through the insert perpendicularly to the longitudinal axis, rotating the insert to a position to cause the hole to align with the opposing inlet and outlet openings to permit food product to pass through the inlet opening in the valve seat, through the hole in the insert and through the outlet opening in the valve seat to the stuffing horn and rotating the insert to cause the hole to become misaligned with the inlet and outlet openings to impede the flow of food product to the stuffing horn.

38. A method for automatically stuffing tubular food casing with food product which comprises causing food product to flow through a stuffing horn into tubular food casing deshirred from a shirred food casing stick on the stuffing horn, an input end of the stuffing horn being interconnected with a pressurized source of food product, radially compressing the stuffed food casing to cause a restricted location along a stuffed food casing length, closing stuffed food casing at the restricted location with a clip using a punch and anvil and

configured so that the punch forces a clip against the anvil to bend the clip around the restricted portion of the casing in the form of a helix.

39. The method of claim 38 wherein two spaced clips are applied to the restricted location in the shape of mirror image helixes and the casing is cut between the applied clips using a knife.

40. A method for automatically stuffing tubular food casing with food product which comprises causing food product to flow through a stuffing horn into tubular food casing deshirred from a shirred food casing stick on the stuffing horn, an input end of the stuffing horn being interconnected with a pressurized source of food product, closing stuffed food casing with a clip using a clipping device, removing the stuffed food product from the vicinity of the clipping device after stuffed food casing is closed using a conveyor, and extending and retracting the conveyor by means of a structure comprising a conveying belt, said belt traveling over slacker idler rollers beneath a conveying surface of the belt that permit the length of the conveying surface to be extended and retracted to extend and reduce a space between the clipping device and the conveying surface.

casing between the applied clips.